

## The Effect of Online Vocabulary Learning on Passive and Active Vocabulary Use at a Range of Proficiency Levels\*

Kei Miyazaki\*\*

Miyazaki, K. (2019). The effect of online vocabulary learning on passive and active vocabulary use at a range of proficiency levels. *Journal of Pan-Pacific Association of Applied Linguistics*, 23(2), 85-108.

Online vocabulary learning tools have been gaining popularity in EFL classrooms. Although a considerable number of research papers have showed its effectiveness, the amount of research on learner progress in terms of productive skills is scarce. Little is also known about what types of learners make progress after using these tools. This is largely due to a lack of consideration of learning strategies and proficiency levels. The present study investigates the effectiveness of an online vocabulary learning device in Japan on the gains in passive and active vocabulary use at a range of proficiency levels. A total of 58 Japanese university students took a pre-instruction test and two post-instruction tests including vocabulary, reading, and essay-writing, allowing the author to investigate the degree of learner progress in mastery of passive and active vocabulary use. Additionally, they completed pre- and post-instruction questionnaires to confirm the device's impact on their progress. The results emerging from cluster analysis and ANOVA verified the use of the device for short-term retention of passive vocabulary for intermediate and advanced learners, but there seemed to be little improvement in active vocabulary use among learners at all proficiency levels. The study highlights the need to include the tool's functions that enhance student levels of word production as well as long-term retention.

**Keywords:** online device, passive vocabulary, active vocabulary, proficiency level

### 1 Introduction

Vocabulary, reading, and writing are inseparable components in English as a Foreign Language (EFL). In earlier studies, Laufer (1989) stated that approximately 95% coverage, in terms of individual word understanding, was

---

\* I would like to thank Professor John Pulasky of Tokyo Woman's Christian University, Professor Peter Collins of Tokai University, and Mr. Masashi Otake of a foreign language center at a university in Japan for their cooperation throughout this study. I also appreciate anonymous reviewers' insightful comments.

\*\* Kei Miyazaki, Professor, Tokai University

sufficient for comprehension of a text. Hu and Nation (2000) reported that understanding 98% of the words in texts makes it possible for learners to adequately comprehend the contents of passages. Additionally, vocabulary and lexical features are important indicators of writing quality, as EFL writers progress in accuracy and fluency through the vocabulary learning (Nation, 2013). From these viewpoints, it seems reasonable to suppose that one serious obstacle EFL learners encounter when reading and writing in foreign language learning is a deficiency in vocabulary knowledge.

While developing a rich vocabulary is an essential part of improving EFL reading and writing ability, it is also a challenge for EFL learners to gain vocabulary knowledge that includes the understanding of the forms, meanings, and practical uses of words. EFL learners usually struggle to memorize words and try to recall them when they do reading and writing activities. In fact, there are several sources of vocabulary-learning burden, such as form-meaning connection, collocation, sounds, and spelling (Webb & Nation, 2017). As for writing, vocabulary use as a subskill is one of the most difficult hurdles for learners to clear in trying to improve their essay-writing ability (Kobayashi, 2016; Llach, 2011). To overcome this situation, much research has shown possible effective methods, strategies, and instructions for vocabulary acquisition, yet how learners can tackle vocabulary tasks is under investigation.

The traditional medium of vocabulary learning includes tools such as word-lists, dictionary use, and glossing. Among them, as a context-based academic vocabulary learning technique, glossing is often promoted as a method for helping increase the percentage of known words in a text (Ko, 2012; Nation, 2013; Schmitt, 2008). Glossed items are usually located close to the reading passages, supplying forms of unfamiliar words and helping to limit continual dictionary consultation that may hinder or interrupt foreign language reading and writing processes (Lomicka, 1998; Webb & Nation, 2017). Several studies have found that glossing not only helps EFL learners to learn new words effectively, but also enhances long-term word retention, leading to the improvement of productive skills (Nation, 2013; Zandieh & Jafarigohar, 2012).

In addition, the recent rise of technology has made it possible to use digital learning devices for vocabulary learning and much research has focused on their effectiveness (Kalyuga, Mantai, & Marrone, 2013; Khezrlou, Ellis, & Sadeghi, 2017). As a result of advancements in computer technology and media, the incorporation of glossing into computer software has been developed in an attempt to improve EFL vocabulary learning. Several studies have noted the effectiveness of using online glossing systems (Abraham, 2008; Al-Seghayer, 2016).

However, most of these studies do not take into account learner backgrounds such as learning strategies and proficiency levels. The use of educational technology in classrooms may, in fact, work out differently in

terms of learner backgrounds. In addition, the past studies have placed importance on technology's effectiveness in supporting learners' receptive skill acquisition. Left largely unsolved, however, is how their learning strategies and proficiency are influenced by the use of online glossing devices in terms of their both passive and active vocabulary acquisition.

The present study examines the effectiveness of an online vocabulary learning tool in Japan on the gains in passive and active vocabulary use of Japanese university students at a range of proficiency levels. The study reveals the extent to which using an online glossing system impacted students' reading and writing proficiencies. In addition, this study identifies difficulties related to the enhancement of productive skills with the online glossing system.

## **2 Literature Review**

### **2.1 Definition of vocabulary knowledge**

Vocabulary knowledge is generally considered one of the main elements required for EFL proficiency. Considering the importance of vocabulary knowledge as it leads to improvement of reading comprehension and writing ability, it is worth defining vocabulary knowledge here.

Laufer and Nation (1995) differentiated between receptive and productive vocabulary knowledge 25 years ago. The former refers to words learners recognize when they encounter them. Meanwhile, the latter refers to the vocabulary that learners have been taught and are expected to use. Laufer (1998) stated that there are three components of vocabulary knowledge. One of them is receptive knowledge, which means understanding the core meaning and most frequent uses of a word. The other two components are types of productive knowledge: controlled productive knowledge and free productive knowledge. Controlled is related to producing words while performing tasks. Free productive knowledge, on the other hand, is relevant to the use of words without any given tasks or particular learning situations in which learners write free essays. Some experts used other terms to define these types of knowledge. For example, Milton (2009) used "passive" vocabulary knowledge to mean receptive and "active" to mean productive. Passive vocabulary refers to the words that learners can understand, but are not yet able to use. Active vocabulary, on the other hand, means the words that learners can understand and use in language activities. (Schmitt, 2008).

One major controversy concerning these types of vocabulary knowledge is whether the research on active and passive vocabulary use is to be conducted separately or as a continuum. Read (2000) stated that the distinction between the two types is of knowledge and use in speech and writing. Thus, although the relation between passive and active vocabulary

use seems to be a continuum, it has proven difficult to pinpoint how and at what point words become available for active use. Webb and Nation (2017) also describe the challenge of viewing the connection between the two types of vocabulary knowledge from different perspectives, stating that it is usually easier to recall the meaning of a word passively than it is to learn and recall the form of a word in order to actively produce it. On the other hand, Seyed and Hadi (2016), though admitting that it is demanding to simultaneously investigate all kinds of vocabulary knowledge, including as grammar, collocation, degree of frequency, and stylistic register constraints, claim that explicit vocabulary instruction would make it possible to improve retention and to subsequently convert vocabulary use from passive to active.

In general, there seems to be a common recognition regarding the existence of passive and active vocabulary use, but as Schmitt (2010) stated, the threshold at which passive vocabulary becomes active vocabulary use is not clear.

## **2.2 Vocabulary learning strategies**

As mentioned above, knowing a word involves knowing the form, meaning, and use of the word (Webb & Nation, 2017), which is the basis for communication in EFL contexts and is an essential part of mastering a foreign language (Schmitt, 2008). To develop lexical knowledge, learners are required to be efficient autonomous learners who use learning strategies both inside and outside the classroom. Learning strategies were defined by Oxford (1990) as “specific actions taken by the learners to make learning easier, faster, more enjoyable, more self-directed, more effective” (p. 8). She created a questionnaire known as the Strategy Inventory Language Learning (SILL) which divides learning strategy items into six categories: memory, cognitive, compensation, metacognitive, affective, and social strategies.

Regarding vocabulary learning strategies, Schmitt (1997) modified Oxford’s (1990) learning strategies, focusing on vocabulary learning in the Japanese context. He divided the vocabulary learning strategies into five main types: determination, social, memory, cognitive, and metacognitive. Although some researchers focused on a particular strategy as effective for learner vocabulary acquisition, such as the memory strategy’s efficacy (Sozler, 2012) and the cognitive strategy’s positive effect on long-term retention (Ghorbani & Riabi, 2011; Pérez & Alvira, 2017), Schmitt (2008) emphasized that learners should use a combination of strategies, instead of any single strategy, in learning vocabulary.

Some researchers analyzed memory and cognitive strategies from the perspective of vocabulary learning in context. For example, Nielsen (2003) differentiated between contextualized and decontextualized vocabulary learning strategies, stating that at early stages of language development, decontextualized vocabulary instruction is more effective in building a

fundamental vocabulary base than contextual reading. Nielsen recommends that basic level learners receive decontextualized vocabulary instruction using word lists. As the learners increase their vocabulary knowledge, they should be encouraged to engage in more context-based vocabulary learning.

In a similar vein, some researchers claim that a combination of explicit and implicit vocabulary learning is effective when, in early stages, vocabulary is learned explicitly and out of context, followed, in later stages, by context-based vocabulary learning. (Carter, 2001; Hunt & Beglar, 2005; Seyed & Hadi, 2015).

In this way, although vocabulary learning strategies have been classified differently, the common areas as condensed in SILL by Oxford (1990) are mainly memory, cognitive, compensation, and metacognitive strategies. There has been little clear understanding, however, of which learning strategies can be effective to help EFL learners retain words and use them actively, due to the fact that vocabulary learning involves other complicated factors such as instructional techniques, individual learner character, and learner proficiency levels (Gu, 2003; Nation, 2013).

### **2.3 Glossing as an effective vocabulary learning tool**

The strategies mentioned above have led to several instructional techniques and learning instruments inside and outside the classroom. In a teaching situation that encourages learners to use vocabulary learning strategies, common tools include word lists, dictionary use, workbooks, and vocabulary cards. As an effective technique that enables learners to successfully use memory, cognitive, compensation, and metacognitive strategies for vocabulary acquisition, glossing has also been utilized both inside and outside the classroom.

Glossing has been defined in many ways, depending on its various functions. The most familiar definition stated by Lomicka (1998) describes glossing as word meanings “typically located in the side or bottom margins” (p. 41) that supply forms for unfamiliar words, “which may help to limit continual dictionary consultation” (p. 41). Nation (2013) also stated that glossing can be a substitute for dictionary use, along with “a brief definition or synonym which is provided with the text” (p. 238). These definitions present glossing as a support system that provides authentic vocabulary acquisition in a particular context.

Several studies have investigated the effect of glossing; their findings revealed that glossing helps EFL learners learn new words. They also concluded that glossing enhances both short- and long-term word retention (Hong, 2010; Ko, 2012). These findings are relevant to the memory strategies in SILL. In addition, Hong (2010) pointed out that glossing is related to the compensation strategies, stating that when learners face unfamiliar words in a text, they are required to infer the appropriate meaning that exactly fits the

context. In this case, glossing can effectively support guessing from context and prevents learners from making incorrect inferences (Nation, 2013). Moreover, glossing allows learners to develop metacognitive strategies, as noted by Nation (2013), who stated that glossing allows learners to be independent from teachers, thereby becoming autonomous learners. As they attempt to memorize words within the context during reading activities, this procedural and declarative knowledge results in development of learners' metacognitive strategies.

In terms of cognitive strategies, Vela (2015) investigated how different types of glossing conditions affect learners' reading comprehension and incidental vocabulary learning. The results of the study indicated that glossing helped learners overcome the difficulty of memorizing vocabulary. Similar research was conducted by Shiki (2008) in Japan. This study compared four glossing-types, including L1 equivalent, L2 synonym, L1 multiple-choice glossing, and L2 multiple-choice glossing. From the cognitive perspective of L2 reading processes, the most effective glossing-type for word retention was L1 multiple-choice glossing. Although these studies took into consideration participants' proficiency levels, they did not investigate the differences between short- and long-term retention or how to use the vocabulary items in productive ways. The goal of the current research is to provide insight into the improvement of active vocabulary use while taking into account participants' proficiency levels.

## **2.4 Online vocabulary learning system**

Over the last decade, the use of technology in education has increased rapidly. Several vocabulary learning studies have advocated using online systems to facilitate vocabulary retention (Kalyuga et al., 2013; Khezrlou et al., 2017). They argued the benefits of using online vocabulary learning tools, saying that they (1) give learners opportunities to connect three elements: form, meaning, and usage, (2) enhance reading ability, (3) increase the number of words exposed to learners, (4) help retain vocabulary knowledge, and (5) save learners' time and effort in reading texts.

As part of this trend, the incorporation of glossing into computer software has been developed and showed promise. In fact, Abraham's (2008) study revealed a significant impact of computer-mediated glossing on incidental vocabulary acquisition. Another noteworthy study found that vocabulary glossing through different annotation modes, media, and forms improves L2 word acquisition "when presented digitally on a computer screen" (Al-Seghayer, 2016, p. 179).

All the above-mentioned studies paved the way for research on the effects of online vocabulary learning devices; however, due to a scarcity of combination of vocabulary acquisition and learner backgrounds, including their proficiency levels and learning strategies, there is insufficient empirical

evidence. There is also limited understanding of whether or not such online devices can be effective for active vocabulary use. With this in mind, the present study examines the impact of an online vocabulary glossing learning tool in Japan on passive and active vocabulary use by students at a range of proficiency levels.

### **3 Purposes of the Study**

The present study focused on two research areas. The first was the progress of university students' passive vocabulary use through vocabulary knowledge and reading comprehension tests after using the online vocabulary tool, depending on their different learning strategies and proficiency levels:

(1) to ascertain whether an online glossing system can positively affect different types of learners' short- and long-term retention.

The second research area is more related to productive skills:

(2) to investigate whether there is significant improvement in different types of learners' essay writing as active vocabulary use after using the online device.

The second area also provides insight into whether there exists a threshold at which passive vocabulary becomes active vocabulary use.

## **4 Study**

### **4.1 Participants**

A total of 58 Japanese private university students in Japan participated in the study. All the participants were first-year students in a reading-writing class majoring in a variety of fields. All the participants had graduated from high schools affiliated with the university, having received formal English education for seven to nine years. Their proficiency levels were diverse, ranging from basic to advanced, as determined by their scores on the external Global Test of English Communication for Students (GTEC for Students®). Each level corresponds to CEFR levels from B2 to A1 based on the conversion table of CEFR levels with GTEC® produced by the Ministry of Education, Culture, Sports, Science, and Technology in Japan (MEXT, 2018).

### **4.2 Instrument and instructions**

The instrument used in this study was an online glossing system application named *Word Planner*, developed by an electric company in Japan as a granted patent license in 2016. It analyzes words according to frequency and recognition rate within specific contexts in the passage so that learners can

memorize vocabulary quite efficiently. Learners can simultaneously check a word's definition, meaning, pronunciation, and see example sentences. They can also access passage, word list and dictionary views on the same computer screen.

Each participant was given a password to open the application. The instructor could also check each participant's learning process through *Word Planner*. As for the uploading procedures, the instructor prepared usable, copyright-free materials which could be copied and pasted into on-screen fields of the system. They could also type directly into the fields on the screen. Then, the word list was automatically created based on the analysis of the passage installed. The instructor could also include content's URL if necessary, put a title of the passage, and specify the genre of the content, for example politics, literature, art, medicine, or history.

コンテンツ名	コンテンツ種別	登録日	ジャンル	基本認知率	認知率
US Gove4	My	2017/05/30 07:16:30	政治・経済	36.11%	46.37%
sample	My	2017/05/30 07:10:54	ビジネス・ 経営	66.67%	100.0%
White House abroad	My	2017/05/25 11:11:11	政治・経済	32.87%	46.15%
elections-and-voting	My	2017/05/25 19:17:13	政治・経済	36.48%	50.31%
White House issue	My	2017/05/25 11:09:14	政治・経済	55.42%	67.47%
US Gove2	My	2017/05/23 16:36:27	政治・経済	46.03%	52.38%
US Gov3	My	2017/05/23 16:51:55	政治・経済	46.03%	52.38%
US Gove	My	2017/05/23 16:35:00	政治・経済	46.03%	52.38%

Figure 1. Screenshot: Information about attached passage

After the materials had been uploaded, the participants could see the passage and several pieces of relevant lexical information, such as the title of the passage, the date and time which had been uploaded, and its genre. Additionally, two columns to the right of the passage indicated vocabulary recognition rates (Figure 1). The column on the left showed the percentage of the words that learners had already learned in high school according to MEXT's Course of Study. The right column estimated the individual learner's recognition rate, or the percentage of expected known words in the passage. This rate was based on Laufer's (1989) assertion that 95% word coverage is enough to comprehend a written text and Hu and Nation's (2000) 98% assertion. *Word Planner* was expected to help users increase their percentage of known words.

When opening up the contents, the participants saw further columns: frequency of all the words in the passage, a word list, pronunciations, meanings, and definitions (Figure 2). All the word lists in the passage appeared on the screen. When they clicked the button next to a word, they



## The Effect of Online Vocabulary Learning on Passive and Active Vocabulary Use at a Range of Proficiency Levels

could see example sentences. After deciding that they had memorized a word, a participant clicked on the “recognition” box, changing the x-mark into a circle. When the area became a circle, the recognition rate was automatically adjusted (Figure 3).

登場順	頻度 ▼	単語	発音	意味
	3	remarks	<input type="checkbox"/>	<input type="button" value="表示"/>
	3	leaders	<input type="checkbox"/>	<input type="button" value="非表示"/> 指導者
	3	bilateral	<input type="checkbox"/>	<input type="button" value="表示"/>
	2	meeting	<input type="checkbox"/>	<input type="button" value="表示"/>
	2	met	<input type="checkbox"/>	<input type="button" value="表示"/>
	2	participate	<input type="checkbox"/>	<input type="button" value="表示"/>
	2	celebrating	<input type="checkbox"/>	<input type="button" value="表示"/>
	2	stops	<input type="checkbox"/>	<input type="button" value="表示"/>

Figure 2. Screenshot: Word information

**WORD Planner** 英単語登録  総認知率 56.48%

---

総単語スタディ

検索 ▼

頻度 ▼	単語	発音	語彙	辞書	認知
179	the	↔	<input type="button" value="表示"/>	<input type="button" value="D"/>	<input checked="" type="radio"/>
95	and	↔	<input type="button" value="表示"/>	<input type="button" value="D"/>	<input type="checkbox"/>

Figure 3. Screenshot: Individual learner’s recognition mark

Regarding the instructions, this study was conducted on a 1-credit 15-week elective reading and writing course offered for first-year university students and taught by a Japanese instructor. The 90-minute class was held once a week. The primary focus of the course was improving reading and writing skills, as well as mastery of grammar and core expressions. By the end of the semester, the participants were expected to have memorized the target vocabulary in the passages that would be used in the instruction materials and to write expository essays of at least 200 words. Taking into consideration the participants’ proficiency levels as they corresponded to CEFR levels from B2 to A1, the instructor set up a minimum of 200 words for the essay writing.

Each instructional session was divided into four phases. In the

pre-instruction phase, the participants were required to check unknown words from a passage in *Word Planner* in advance outside of class. The instructor could also check which words each participant had identified as unfamiliar. The second phase was a vocabulary check in the passage during the instruction. The participants were asked to check the meanings of the words in the passage and how these words are used in context. The instructor then encouraged the participants to use *Word Planner* at home in order to increase their known-word percentages for the passage. The instructor also uploaded other passages on relevant topics on *Word Planner* which include similar kinds of words and encouraged the participants to memorize these words. In the third phase, the participants were required to demonstrate comprehension of the reading passage and additional passages. The instructor then had the learners check the meanings of the words and conducted the reading-writing class through paraphrasing, translation, and summarizing activities. In the final phase, they learned how to write an expository essay on the topic featured in the passage. After receiving instructor feedback, they had a chance to revise their essays.

### 4.3 Research procedures

Since this study was designed to investigate the progress of the participants' ability, three vocabulary and reading comprehension tests, and three essay writing tests were conducted. In addition, pre- and post-instruction questionnaires were administered (Figure 4). The three vocabulary and reading tests made it possible to examine participants' short- and long-term retention as passive vocabulary use. In this study, short-term retention refers to the participants' performance on the test immediately after the instruction and the use of the device, and long-term retention refers to the one on the test two months after the instruction and the use of the device (Ghorbani & Riabi, 2011). The essay tests allowed the researcher to investigate their progress in terms of active vocabulary use.

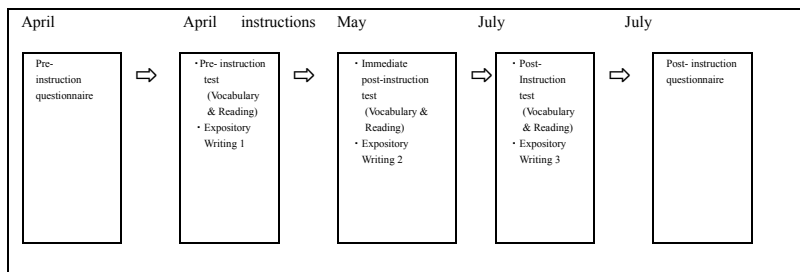


Figure 4. Overall process of instructions and tests

## The Effect of Online Vocabulary Learning on Passive and Active Vocabulary Use at a Range of Proficiency Levels

Before the instructions, the pre-instruction questionnaire was given to ascertain whether there were different learning strategies among the participants. This questionnaire drew on the Strategy Inventory for Language Learning (SILL) by Oxford (1990), which features 50 question items; the study's pre-instruction questions emphasized the memory, cognitive, compensation, and metacognitive strategies. In a pilot study in the previous year with a different group of participants, the questionnaire's unidimensionality was verified by applying the Rasch Rate Scale and excluding misfit items. Acceptable values for infit/outfit mean-square values for run-of-the-mill test were set up as 0.7 – 1.3 by Linacre (2014). Finally, 29 question items were given to the participants (See Appendix A).

At the beginning of the semester, participants took a pre-instruction test on vocabulary-reading and writing an expository essay of at least 200 words. The vocabulary-reading test consisted of three parts: matching vocabulary items with their definitions, fill-in-the-blank questions, and reading comprehension test items. These were related to the words and phrases from the passages they would be reading during the semester (See Appendix B). The essay writing prompt was also relevant to the topic of the passages to be used (See Appendix D).

During the four-month instruction phase, participants read three passages on environmental topics. They also learned skills necessary for writing expository essays. After the instruction phase, they took the second set of vocabulary and reading tests (See Appendix C). These were not exactly the same as the first tests had been, but in the pilot study, the difficulty of these two tests had been equated by performing item analyses that examined the discriminating power of each question item by modifying the items which had included inappropriate distractors. In addition, the participants were given an immediate post-instruction essay-writing test on the same topic as the passages used in the instruction phase.

Two months later, they took another kind of vocabulary and reading test with the same difficulty level as that of the first two vocabulary and reading tests; this series made it possible to examine participants' short- and long-term vocabulary retention. As before, the participants were also given an essay writing test on the same topic as the passage used in the instruction phase (See Appendix D). After the third test, a post-instruction questionnaire was administered to confirm *Word Planner's* impact on the participants and their ways of using it. The four-item questionnaire consisted of five-point Likert-scale questions: (1) Do you think *Word Planner* was useful in your vocabulary learning?; (2) How many times did you use *Word Planner*?; (3) Do you think *Word Planner* was useful to your reading comprehension?; and (4) Do you think *Word Planner* was useful to you essay writing? It also included two open-ended question items: (5) Why did (or didn't) you use *Word Planner* repeatedly? and (6) Which mode(s) or function(s) did you most often use in *Word Planner*?"

#### 4.4 Grouping based on learning strategy backgrounds

A cluster analysis was conducted on the pre-instruction questionnaire responses, dividing them into several categories. The study adopted Ward's method as a linkage rule and obtained a dendrogram (Figure 5). In order to identify subgroups of learners, cutoff point was set at around 10; the 58 participants can be classified into three major clusters.

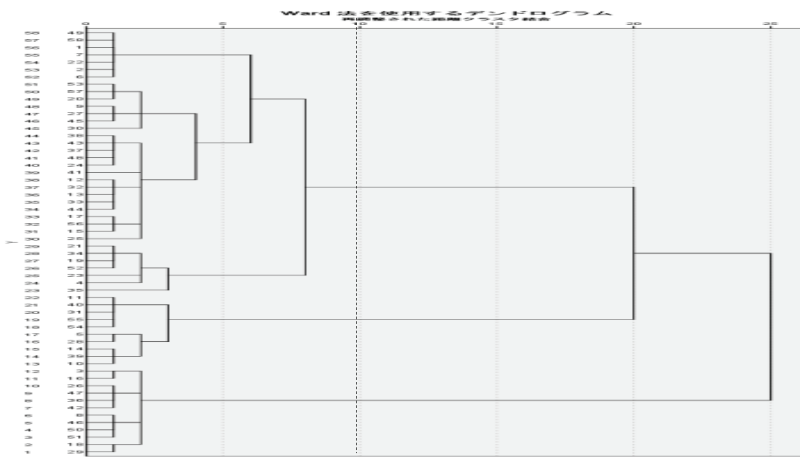


Figure 5. Dendrogram of the cluster analysis using Ward Linkage

As shown in the data, a salient feature of the first cluster is that almost all the learners tended to remember a new word by making an image or picture of the word in textbooks, and when reading, skimming the passage and then going back and reading carefully. They typically took a long time to understand a text. The second group tended to translate the words one by one, but when facing with new words, they made guesses without looking up them in a dictionary. The third group tried memorizing the words in a sentence, and planned to master them during self-study, about which they were relatively enthusiastic (Table 1).

Table 1. Learning Features or Strategies of Each Group

Group	Features
Group A (36 students)	<ul style="list-style-type: none"> <li>▪ They tend to remember a new word by making image or picture of the word; after that, they often use dictionary.</li> <li>▪ When reading, skim passage and then go back and read carefully.</li> <li>▪ They take a long time to read a passage.</li> </ul>
Group B (10 students)	<ul style="list-style-type: none"> <li>▪ They tend to try to translate the words one by one.</li> <li>▪ When facing the new words, make guesses without looking them up in dictionary.</li> </ul>

## The Effect of Online Vocabulary Learning on Passive and Active Vocabulary Use at a Range of Proficiency Levels

- Group C (12 students)
- They often use dictionaries, but try to memorize the words in a sentence.
  - They make plans for English self-study.

To determine whether there were different proficiency levels among these three groups, a one-way ANOVA was conducted, based on their external test scores on the GTEC College Test Edition (GTEC CTE®). The results of the ANOVA showed that the three groups were statistically different in terms of their English language proficiency (Table 2). According to a multiple comparison using Ryan's method, the results (Table 3) indicate that the proficiency, in descending order, is Group C, Group A, Group B. Based on the conversion table released by MEXT (2018), Group C was designated as advanced learners, Group A as intermediate, and Group B as basic.

Table 2. Results of One-way ANOVA

Source	SS	df	MS	F	p	$\eta_G^2$
GTEC	41458.70	2	20729.40	19.19	0.00	0.41
Error[WC]	59408.32	55	1080.15			
Total	100867.12	57				

Note: \* $p < .05$

Table 3. Multiple Comparisons Among Three Groups

Pair	r	Nominal level	t	p	sig.
C - B	3	0.02	6.14	0.00	s.
C - A	2	0.03	4.27	0.00	s.
A - B	2	0.03	3.37	0.01	s.

Note:  $MSe=1080.15$ ,  $df=55$ , \* $p < .05$

### 5 Result and Discussion

To examine the progress of passive vocabulary mastery, the study compared the three vocabulary-reading test results. The advanced learners (Group C) initially scored higher on the pre-instruction test and made considerable progress in the immediate post-instruction test. They had also retained their vocabulary knowledge at the time of the post-instruction test (Figure 6). According to ANOVA ( $F(2, 22) = 10.34$ ,  $p < .05$ ,  $\eta_G^2 = .52$ ) and Ryan's multiple comparison (Table 4), there was significant difference between the first and second tests and a slight difference between the second and third. However, they scored quite high on the second test; it can be concluded that they had retained their vocabulary knowledge. Thus, they were successful in terms of both short-term and long-term retention.

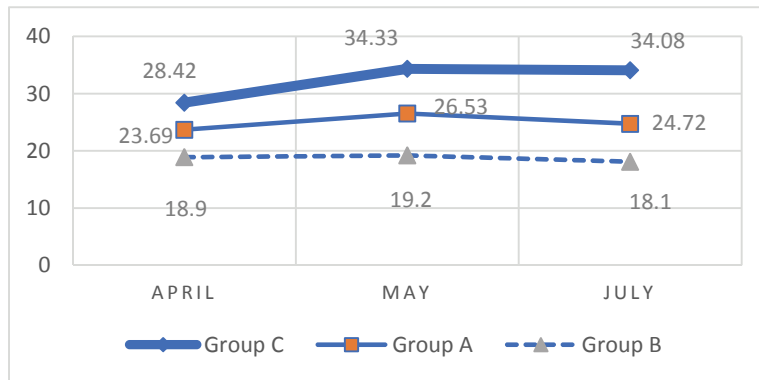


Figure 6. Groups A - C: Vocabulary &amp; reading tests scores

Table 4. Multiple Comparisons of Vocabulary &amp; Reading Tests

Levels	Pair	<i>r</i>	Nominal level	<i>t</i>	<i>p</i>	sig.
Advanced (Group C)	2 – 1	3	0.02	4.02	0.00	s.
	2 – 3	2	0.03	0.17	0.87	n.s.
	3 – 1	2	0.03	3.85	0.00	s.
<i>MSe</i> =12.99, <i>df</i> =22, * <i>p</i> < .05						
Intermediate (Group A)	2 – 1	3	0.02	4.15	0.00	s.
	2 – 3	2	0.03	2.65	0.01	s.
	3 – 1	2	0.03	1.51	0.14	n.s.
<i>MSe</i> =12.99, <i>df</i> =22, * <i>p</i> < .05						

In response to “How many times did you use *Word Planner*?” on the post-instruction questionnaire, 75% of Group C answered they had used it over 10 times in order to try to raise their percentages of known words. The average of this group’s recognition rate of known words in all the passages was 92.7%. They showed a strong grasp of metacognitive strategy, having intended to often use *Word Planner*.

The intermediate learners (Group A) made progress between the first and second tests, but the score is lower for the third test. According to ANOVA ( $F(2, 70) = 20.62, p < .05, \eta_G^2 = .17$ ) and Ryan’s multiple comparison (Table 4), there was a significant difference between the first and second tests, but not between the first and third; this suggests that they returned to their initial vocabulary ability by the time of the third test. Thus, they were successful in terms of short-term retention, but not in long-term. In the post-instruction questionnaire, 91% of them answered that they had used *Word Planner* five or fewer times (Figure 7). The average of this group’s recognition rate was 80%.

## The Effect of Online Vocabulary Learning on Passive and Active Vocabulary Use at a Range of Proficiency Levels

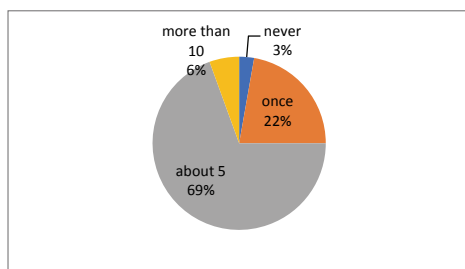


Figure 7. Results of the question for intermediate learners, “How many times did you use *Word Planner*?”

The basic level learners (Group B) did not make any progress in vocabulary and reading tests. ANOVA shows there is no significant difference among the 3 tests,  $F(2, 18) = .78, p = .66, \eta_G^2 = .04$ . Most of them (90%) responded they used *Word Planner* only once or twice. The average of this Group’s recognition rate is 44%.

As for other questions in the post-instruction questionnaire, to the question, “Do you think *Word Planner* was useful in your vocabulary learning?”, a surprising 80% of all the participants responded, “Yes, very much” or “Yes.” Moreover, 65% responded in one of these two ways to the question, “Do you think *Word Planner* was useful to your reading comprehension?” To the open-ended question, “Why did (or didn’t) you use *Word Planner* repeatedly?”, most advanced and intermediate students responded, “I want to improve vocabulary knowledge” (Figure 8). The second most common answers were related to their motivation and metacognitive strategy. Especially, the answer of “I want to raise the percentage of known words” demonstrates that they were conscious of the recognition rate in *Word Planner*. Others answered, “It saved time I would have spent using a dictionary.” The third most common answer was “*Word Planner* is convenient to use in place of note-taking.”

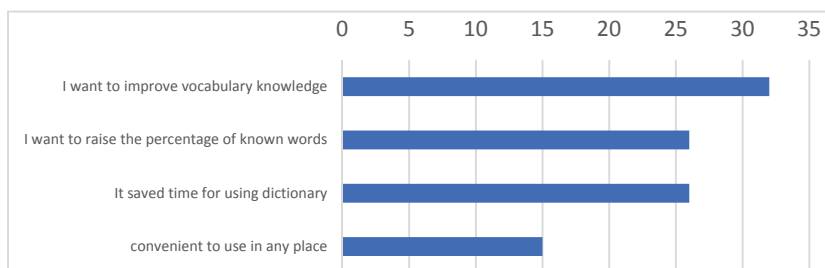


Figure 8. Advanced/intermediate learners’ answers: “Why did (or didn’t) you use *Word Planner* repeatedly?”

On the other hand, most basic students reported using *Word Planner* only once. To the question of “Why did (or didn’t) you use *Word Planner* repeatedly?”, many responded, “It didn’t give any impact” and “It is hassle to use the system” (Figure 9). It is expected that the device developers will create more attractive functions for the basic level learners in *Word Planner* options. Further research will be required by a protocol survey.

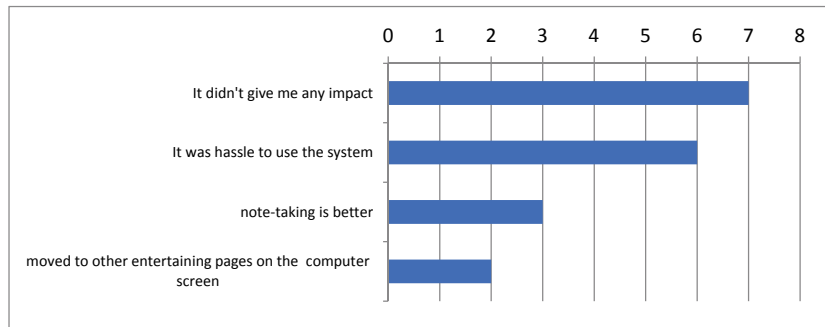


Figure 9. Basic learners’ answers: “Why did (or didn’t) you use *Word Planner* repeatedly?”

Overall, the result of the pre-instruction and post-instruction comparison showed that the online glossing system was partially effective for these Japanese university learners. Positive effects could be seen on advanced learners’ short- and long-term retention, and for the intermediate level, it was useful for short-term retention. However, it was not effective for basic learners. The post-instruction questionnaire for the advanced and intermediate learners indicated that the recognition rate of known words could have encouraged them to use the system repeatedly, sparking consciousness-raising and input enhancement. The results also suggested that the use of the system saved learner time while reading texts and that easy access to the glossed word made learning more manageable.

Concerning the active use of vocabulary, the essays were scored by two raters, one Japanese instructor and one native English-speaking instructor. The analytic scoring scales used in the current study featured five components: Content, Organization, Coherence & Cohesion, Vocabulary Use, and Grammar & Usage. All of the rating scales offered a range of “Very Poor (1),” “Unsatisfactory(2),” “Moderate(3),” “Good(4),” and “Excellent(5).” Because inter-rater reliability correlation coefficients for all the essay scores were relatively high (Table 5), the average scores between the two raters were utilized for the investigation of the essay writing.



The Effect of Online Vocabulary Learning on Passive and Active Vocabulary Use at a Range of Proficiency Levels

Table 5. Correlation Between Two Raters for Essay Writing

Category	Rater A (Mean)	Rater B (Mean)	Correlation	Cronbach's $\alpha$
Content	2.99	3.10	0.70	0.79
Organization	3.99	3.40	0.70	0.81
Coherence & Cohesion	3.65	2.86	0.67	0.80
Vocabulary Use	2.69	2.78	0.81	0.89
Grammar & Usage	2.62	3.39	0.85	0.92

Note: \* $p < .05$

The results of the pre-instruction tests, as compared to the subsequent two post-instruction tests, showed that, although the total scores of the essays written by advanced and intermediate learners were improved, the vocabulary category in the analytic rating score did not improve. These participants eventually improved their mastery of rhetorical features such as Content, Organization, and Coherence & Cohesion after receiving instruction on how to write expository essays (Table 6).

Table 6. Descriptive Statistics for Expository Essay Writings

Categories	Levels	First Essay	Second Essay	Third Essay
Content	Advanced	3.24	4.13	4.26
	Intermediate	2.77	3.17	3.55
	Basic	2.00	2.15	2.19
Organization	Advanced	3.82	4.55	4.67
	Intermediate	3.03	4.12	4.25
	Basic	2.12	2.83	3.00
Coherence & Cohesion	Advanced	3.00	3.90	4.02
	Intermediate	2.71	3.34	3.21
	Basic	2.21	3.00	3.01
Vocabulary Use	Advanced	3.29	3.33	3.22
	Intermediate	2.83	2.88	2.91
	Basic	2.10	1.90	2.20
Grammar & Usage	Advanced	3.70	3.72	3.79
	Intermediate	3.09	3.08	3.08
	Basic	2.03	2.17	2.33

However, focusing on the subcategory "Vocabulary Use," the study did not detect any effectiveness in the three essay-writing tests (Figure 10). ANOVA revealed no significant differences among the tests for advanced learners,  $F(2, 22) = .184, p = .83, \eta_G^2 = .08$ ; intermediate learners,  $F(2, 70) = .63, p = .54, \eta_G^2 = .01$ ; and basic learners,  $F(2, 18) = 1.91, p = .18, \eta_G^2 = .12$ . The effect size was small in the intermediate level class.

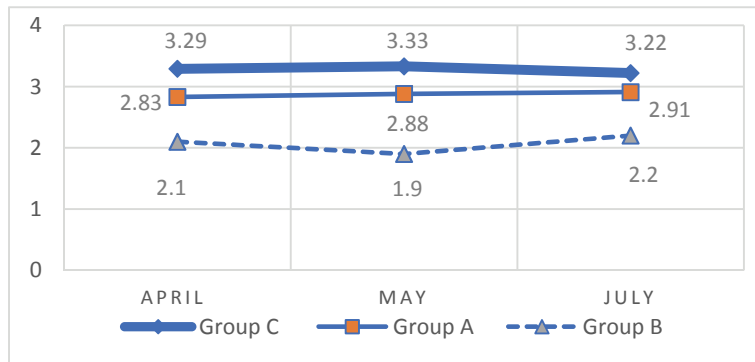


Figure 10. Results of three groups of “Vocabulary Use” at three times

It is interesting to note the post-instruction questionnaire result concerning the writing. To the question, “*Word Planner* was useful to your essay writing?”, 65% of the participants answered, “Strongly agree” or “Agree.” They might have felt that *Word Planner* was effective, when, in fact, their active vocabulary use was not improved.

Another noteworthy result is that the students earning the top five high scores on the vocabulary component of the essay responded the same way to the question, “Which mode(s) or function(s) did you often most use in *Word Planner*?” All of them chose “Example sentences”; they must have learned how to use target words and collocations in the context of the example sentences, leading, in turn, to the advancement of their productive skills.

The findings of this study suggest that the learners believed they accelerated their passive vocabulary memorization using *Word Planner*, but the survey results showed that the impact was not long-term for immediate and basic level learners due to the lack of adequate exposure and reinforcement during the 7-week period. Intermediate and basic level students had metacognitive strategies in common; they did not make plans or goals for developing their vocabulary knowledge. As for productive skills, only focusing on raising recognition rates through *Word Planner* was not sufficient to improve active use for all the learners. In this respect, the findings support the previous claims made by Read (2000) and Schmitt (2010), which described the difficulty of integrating passive and active vocabulary use.

## 6 Conclusion

The present study has explored the effect of the online glossing system *Word Planner* in terms of passive and active vocabulary use at a range of

## The Effect of Online Vocabulary Learning on Passive and Active Vocabulary Use at a Range of Proficiency Levels

proficiency levels. Given the findings, it seems reasonable to say that, depending on learner proficiency background, appropriate online glossing systems should be taken into account when planning curriculum and individual courses.

There are both positive results and room for improvement. On the positive side, for basic learners who did not routinely use dictionaries, *Word Planner* helped them check vocabulary online at least once or twice. They might have been forced to do it by the instructor, but paying attention to words for better comprehension is an important first step of basic learners. Moreover, for intermediate learners who took a long time to read texts, *Word Planner* enabled them to reduce time by checking words online. Finally, for advanced learners who had some mastery of the metacognitive learning strategy, recognition rate was a practical and effective tool which accelerated their self-study.

On the other hand, there are several areas for improvement. First of all, although learners may have a favorable view of using an online glossing system, instructors should help them set achievement goals for recognition rates by providing additional learning tools such as portfolios or report notes, so that learners can be continually exposed to target vocabulary and improve their long-term retention. In addition, for basic learners, including less-motivated learners, to be able to focus more on lexical items during exposure, system developers could create more functions, including pictures, animations, or dynamic images, which help learners bridge their prior knowledge and the new information in the text. They might, in this situation, have more motivation to use such a system multiple times. Additionally, materials developers, as well as instructors, should consider the contiguity principle of learner needs, increasing awareness of how to advance their productive skills by adding more example sentences to the system or providing collocation quizzes and tests, so that they can enhance their active vocabulary use. Since the choice of vocabulary items plays an important role in the assessment of writing, developing more practical systems for writing would be essential to provide EFL learners with features making certain words and multi-word combinations memorable.

Despite these implications, it is still insufficient to generalize these findings from the present study to other populations, as the study utilized a small sampling and the participants in this study were all from a single university in Japan. Replication studies with other populations, particularly subjects in other countries or with other online glossing systems, are needed in order to obtain more generalized results. In addition, the equal difficulties of the three writing prompts need to be examined for more accurate measurement of the participants' progress in writing ability. Thus, future large-scale investigations are needed.

## References

- Abraham, L. B. (2008). Computer-mediated glosses in second language reading comprehension and vocabulary learning: A meta-analysis. *Computer Assisted Language Learning*, 21(3), 199-226.
- Al-Seghayer, K. (2016). Celebrating the Story of my First Contribution to CALL. *Language Learning & Technology*, 20(2), 179-184.
- Carter, R. (2001). Vocabulary. In R. Carter & D. Nunan (Eds.), *The Cambridge guide to teaching English to speakers of other languages* (pp. 42-27). Cambridge University Press.
- Ghorbani, M. R., & Riabi, N. K. (2011). The impact of memory strategy instruction on learners' EFL vocabulary retention. *Theory and Practice in Language Studies*, 1(9), 1222-1226.
- Gu, Y. (2003). Vocabulary Learning in a Second Language: Person, Task, Context and Strategies. *TESL-EJ*, 7(2). Retrieved from <http://www-writing.berkeley.edu/TESL-EJ/ej26/a4.html>.
- Hong, X. (2010). Review of effects of glosses on incidental vocabulary learning and reading comprehension. *Chinese Journal of Applied Linguistics*, 33(1), 56-72.
- Hu, M., & Nation, I. S. P. (2000). Unknown vocabulary density and reading comprehension. *Reading in a Foreign Language*, 13, 403-430.
- Hunt, A., & Belgar, D. (2005). A framework for developing EFL reading vocabulary. *Reading in a Foreign Language*, 17, 23-59.
- Kalyuga, M., Mantai, L., & Marrone, M. (2013). Efficient vocabulary learning through online activities. *Procedia - Social and Behavioral Sciences*, 83, 35-38.
- Khezrlou, S., Ellis, R., & Sadeghi, K. (2017). Effects of computer-assisted glosses on EFL learners' vocabulary acquisition and reading comprehension in three learning conditions. *System*, 65, 104-116.
- Ko, M. H. (2005). Glosses, comprehension and strategy use. *Reading in a Foreign Language*, 17(2), 125-143.
- Ko, M. H. (2012). Glossing and Second Language Vocabulary Learning. *TESOL Quarterly*, 46(1), 56-70.
- Kobayashi, C. (2016). Lexical errors in the English compositions of Japanese learners. *Foreign Language Education*, 42, 39-51.
- KPO Inc. (2016). *Word Planner* [online version]. Retrieved from <https://wordplanner.jp/>
- Laufer, B. (1989). What percentage of text lexis is essential for comprehension? In C. Lauren & M. Nordman (Eds.), *Special language: From humans thinking to thinking machines* (pp. 316-323). Clevedon: Multilingual Matters.
- Laufer, B. (1998). The development of passive and active vocabulary in a second language: Same or different? *Applied Linguistics*, 19, 255-271.

The Effect of Online Vocabulary Learning on Passive and Active Vocabulary Use at a Range of Proficiency Levels

- Laufer, B., & Nation, I. S. P. (1995). Lexical richness in L2 written production: Can it be measured? *Applied Linguistics*, 16(3), 307-322.
- Laufer, B., & Girsai, N. (2008). Form-focused instruction in second language vocabulary learning: a case for contrastive analysis and translation. *Applied Linguistics*, 29, 694-716.
- Linacre, J. M. (2014). Winsteps® (Version 3.81.0) [Computer Software]. Beaverton, Oregon: Winsteps.com. Retrieved from <http://www.winsteps.com/>
- Llach, M. P. (2011). *Lexical errors and accuracy in foreign language writing*. Bristol: Multilingual Matters.
- Lomicka, L. L. (1998). To gloss or not to gloss: An investigation of reading comprehension online. *Language Learning and Technology*, 1(2), 41-50.
- MEXT. (2018). *The conversion table between each external test and CEFR*. Retrieved from [http://www.mext.go.jp/b\\_menu/houdou/30/03/\\_ics\\_files/afieldfile/2019/01/15/1402610\\_1.pdf](http://www.mext.go.jp/b_menu/houdou/30/03/_ics_files/afieldfile/2019/01/15/1402610_1.pdf)
- Milton, J. (2009). *Measuring second language vocabulary acquisition*. Clevedon: Multilingual Matters.
- Mizumoto, A., & Takeuchi, O. (2009). Examining the effectiveness of explicit instruction of vocabulary learning strategies with Japanese EFL university students. *Language Teaching Research*, 13(4), 425-449.
- Nation, I. S. P. (2013). *Learning vocabulary in another language*. (2<sup>nd</sup> ed). Cambridge: Cambridge University Press.
- Nielsen, B. (2003). *A review of research into vocabulary learning and acquisition*. Retrieved from <http://www.kushiro-ct.ac.jp/library/kiyo/kiyo36/Brian.pdf>
- Oxford, R. (1990). *Language learning strategies: What every teacher should know*. Boston: Heinle and Heinle.
- Pérez, L., & Alvira, R. (2017). The acquisition of vocabulary through three memory strategies. *Colombian Applied Linguistics Journal*, 19(1), 103-116.
- Read, J. (2000). *Assessing vocabulary*. Cambridge: Cambridge University Press.
- Schmitt, N. (1997). Vocabulary learning strategies. In N. Schmitt & M. McCarthy (Eds.), *Vocabulary: Description, acquisition and pedagogy* (pp. 199-227). Cambridge: Cambridge University Press.
- Schmitt, N. (2000). *Vocabulary in language teaching*. Cambridge: Cambridge University Press.
- Schmitt, N. (2008). Review article: Instructed second language vocabulary learning. *Language Teaching Research*, 12, 329-363.
- Schmitt, N. (2010). *Researching vocabulary: A vocabulary research manual*. New York: Palgrave Macmillan Press.

- Seyed, A. S., & Hadi. S. (2016). Impact of explicit instruction on writing achievement of upper-intermediate EFL learners. *International Education Studies*, 9(4), 141-154.
- Shiki, O. (2008). Effects of glosses on incidental vocabulary learning: Which gloss-type works better, L1, L2, single choice, or multiple choices for Japanese university students? *Journal of Inquiry and Research*, 3(87), 39-56.
- Sozler, S. (2012). The effect of memory strategy training on vocabulary development of Austrian secondary school students. *Procedia-Social and Behavioral Sciences*, 46, 1348-1352.
- Vela, V. (2015). *Using glosses for incidental vocabulary acquisition*. Retrieved from <http://creativecommons.org/licenses/by-nc-nd/4.0/>
- Webb, S., & Nation, I. S. P. (2017). *How vocabulary is learned*. Oxford, UK: Oxford University Press.
- Zandieh, Z., & Jafarigohar, M. (2012). The Effects of Hypertext Gloss on Comprehension and Vocabulary Retention under Incidental and Intentional Learning Conditions. *English Language Teaching*, 5(6), 60-71.

## Appendix A

### Pre-instruction questionnaire about vocabulary learning strategies

1. I use new SL words in a sentence so I can remember them.
  2. I connect the sound of a new SL word and an image or picture of the word to help me remember the word.
  3. I remember a new SL word by making a mental picture of a situation in which the word might be used.
  4. I use rhymes to remember new SL words.
  5. I use dictionary to remember new SL words.
  6. I physically act out new SL words.
  7. I review SL lessons often.
  8. I remember new SL words or phrases by remembering their location on the page, on the board, or on a street sign.
  9. I say or write new SL words several times.
  10. I try to talk like native SL speakers.
  11. I use the SL words I know in different ways.
  12. I start conversations in the SL.
  13. I watch SL language TV shows spoken in SL or go to movies spoken in SL.
  14. I read for pleasure in the SL.
  15. I write notes, messages, letters, or reports in the SL.
  16. I first skim an SL passage (read over the passage quickly) then go back and read carefully.
  17. I look for words in my own language that are similar to new words in the SL.
  18. I try to find patterns in the SL.
  19. I find the meaning of an SL word by dividing it into parts that I understand.
  20. I try to translate word for word.
  21. I make summaries of information that I hear or read in the SL.
  22. To understand unfamiliar SL words, I make guesses, not using dictionary.
  23. When I can't think of a word during a conversation in the SL, I use gestures.
  24. I read SL without looking up every new word.
  25. I try to guess what the other person will say next in the SL.
  26. If I can't think of an SL word, I use a word or phrase that means the same thing.
  27. I plan my schedule so I will have enough time to study SL.
  28. I have clear goals for improving my SL skills.
  29. I think about my progress in learning SL.
- 1 =never or almost never use this strategy      2=I occasionally use the strategy  
3= I sometimes use this strategy                      4= I usually use this strategy                      5= I always use this strategy

# The Effect of Online Vocabulary Learning on Passive and Active Vocabulary Use at a Range of Proficiency Levels

## Appendix B

### Sample reading material used in the instructions

The United Arab Emirates (UAE) is a country with a lot of oil. Oil brings the country billions of dollars each year. So why is the UAE building a city that uses very little oil? The answer is simple: oil will not last forever. However, there is another resource people can use instead of oil—the sun.

In fact, engineers are now building a new city that uses mostly solar energy for its power. The city is called Masdar, and it is about 20 miles (32 km) from Abu Dhabi, one of the largest cities in the UAE. If it is a success, Masdar will be the first city in the world that uses little or no oil.

Masdar is a small city—only 2.3 square miles (6 square km). In the future, it will hold 50,000 people, more than 1,000 companies, and a university. Its streets are very narrow. The houses are close to each other. The shade from the houses helps keep the streets cool.

There are no cars on the streets of Masdar. Because the city is so small, people can walk to most places. If they get tired, they can use the Personal Rapid Transit (PRT). These small, solar-powered cars move underground, like a subway. The cars have no drivers. People just tell the car where they want to go, and it takes them there.

Masdar will reuse as many resources as possible. It will reuse about 80 percent of its water and change most of its waste into energy. People in Masdar are even using building materials that they can reuse in the future.

Can this city really be successful? No one knows, but if it is, there could be other low-energy cities around the world in the future.

## Appendix C

### Part of immediate post-instruction vocabulary & reading test

#### A. Choose the word from the box below to match the following definition.

1. a signal that controls cars, bikes, humans on a road, by means of red, yellow and green signals that show when you must stop and when you can go.  
— (      ).

⋮

10. the activity of looking at various things on the Internet in order to find something interesting. — (      ).

a. backpacking	b. commute	c. farm	d. flat area
e. government	f. pollution	g. predict	h. surfing
i. traffic lights	j. working holiday		

#### B. Fill in each blank with the appropriate word to match the Japanese.

1. I was amazed at his (      ) action. 私は彼の危ない動きを見て驚いた。

⋮

#### C. Choose the best word to complete each sentence.

1. She was (      ) as baby-sitter, but she also had to sweep the room.  
(a) stayed    (b) polluted    (c) hired    (d) connected

⋮

#### D. Read the following sentence and choose the best answer for each question.

The United Arab Emirates (UAE) is a country with a lot of oil . . . . No one knows, but if it is, there could be other low-energy cities around the world in the future.

- |   |
|---|
| <ol style="list-style-type: none"><li>1. What is the <b>main idea</b> of this passage?<ol style="list-style-type: none"><li>A. Masdar is becoming poor without oil money.</li><li>B. Masdar is trying not to use any oil.</li><li>C. Masdar is aiming to recycle all of its oil.</li><li>D. Masdar has a serious shortage of oil.</li></ol></li><li style="text-align: center;">⋮</li><li>7. Which is <b>most likely</b> to be true about Masdar's future?<ol style="list-style-type: none"><li>A. It will give up the use of solar power energy.</li><li>B. It will not rebuild any buildings or houses.</li><li>C. It will try to change most of its waste into energy.</li><li>D. It will use up all of the country's oil resources.</li></ol></li></ol> |
|---|

**Appendix D**  
**Essay writing prompts**

	Prompt
Essay 1	Our world produces hundreds of millions of plastic bags, which are intended to only be used once. There are some solutions to the environmental problems plastic bags have caused. Write at least 200 words about a few problems plastic bags cause and solutions to the problems. Write and organize your essay for readers to understand your explanation.
Essay 2	Some people think an international car-free day would be an effective way to reduce air pollution. Write at least 200 words about this project with some specific examples. Write and organize your essay for readers to understand your explanation.
Essay 3	Although many people value their public parks, this space could be better used for other purposes, such as residential areas for the ever-growing population or to develop business and boost economies. Write at least 200 words explaining what kinds of problem happen in the above situation. Write and organize your essay for readers to understand your explanation.

Kei Miyazaki, Professor  
International Education Center  
Tokai University  
4-1-1 Kitakaname, Kanagawa, Japan  
Tel: 0463-58-1211  
Email: keimiyazaki67@gmail.com

Received: August 23, 2019  
Revised: November 11, 2019  
Accepted: December 1, 2019